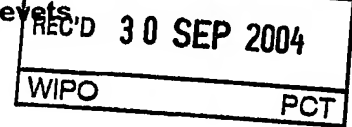




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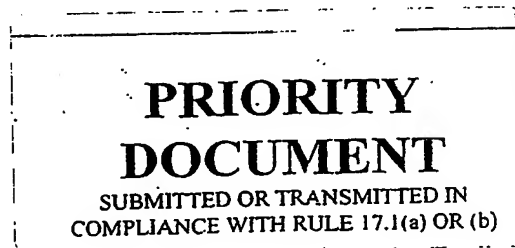
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Apparatus and method for mixing components

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Apparatus and method for mixing components



Field of the invention

5 The invention relates to an apparatus for mixing components for the preparation of emulsion type food products.

Background of the invention

10 Dressings, spreads, sauces and other oil and water emulsion based products are well known. Over the years the number of different variants that is available for such emulsions has grown. When made at home, consumers can make their personal dressing or sauce variant and add the desired ingredients to
15 match their liking. There is also a trend in society to obtain a ready meal or parts of the meal from a restaurant or store without the need to do any cooking activity yourself. It is evident that the variety provided via a restaurant, store or other retail outlet is limited because of the amount of time it
20 takes to make personalized emulsion type products. Also the amount of product purchased if a large variety is offered is very low, and often too low to justify the preparation of this particular variant.

25 Another existing desire is the desire for fresh products. Food products that are prepared in a factory may not fulfill this desire and hence methods have been developed to provide food products, e.g. emulsions that are prepared on the spot from their raw ingredients, mainly oil and water.

30

Furthermore providing a particular product variant may cost a lot of time for preparation, which is undesired for the

consumer who may wish to take or consume the product immediately.

To overcome the latter problems, ways have been developed which
5 provide a metered amount of emulsion, prepared instantaneously
and if desired on demand. Instant in this context is referring
to "on the spot", within a short time in the order of seconds
to minutes. An example of a suitable dispensing unit is
disclosed in WO-A-01/00521. The dispensing unit disclosed
10 therein is a bottle which stores two or more separate fluids
and blends the fluids when dispensing. The two fluids may be
oil and vinegar to prepare dressings. The amount of different
products that may be prepared using such a dispenser is rather
limited and the most advantageous property of this unit is that
15 it enables creating a fresh emulsion instantaneously.

Furthermore the size of this dispensing unit, which is manually
operated, is not enabling efficient preparation of individually
adapted emulsion type products instantaneously for example in a
fast food service restaurant.

20

US-A-5,230,443 addresses the need for a reliable, relatively
inexpensive apparatus and method for dispensing a variety of
condiments through a single dispensing unit in a metered
quantity and at a low flow rate. Providing a device, which
25 comprises a pump, which is fluidly connected to a condiment
source and a dispensing apparatus, solves this need. Multiple
pumps (e.g. 3) may be included wherein each pump is connected
to a different condiment source. This enables independent
dispensing of e.g. 3 different types of condiment.
30 Again this offers only limited variety and requires a separate
condiment source for each type of condiment offered. Also the
products obtained from this device are not fresh products.

It is a further object of the invention to provide an apparatus, which dispenses a variety of products without the need to clean and rinse the entire apparatus on switching to a
5 different variety.

In summary the flexibility provided by the prior art devices is low. Either the known dispensers are fed with finished products and only able to deliver this on demand, or the instant
10 preparation of product delivers fresh product with no or limited variety in product composition or high contamination when switching to a new variety.

Definition of the invention

15

The present invention seeks to solve this problem by providing an apparatus, which comprises means enabling post-addition of ingredients wherein these ingredients are arranged in families of ingredients.

20

Thus, the present invention provides an apparatus for preparing and dispensing a food product, preferably oil and water containing emulsions, the apparatus comprising a frame comprising

- 25 - a source unit (a) comprising component reservoirs;
- selection means for selecting the desired components and/or their ratio
- a source unit (b) for post-added ingredients wherein the post-added ingredients are arranged in at least two
30 families;
- selection means for selecting the desired post-added ingredients;

- processing means suitable for mixing the components from the component reservoirs and the post-added ingredients;
- a dispensing unit.

5

The invention also relates to a method for preparing an emulsion type product.

Detailed description of the invention

10

The apparatus is suitable for preparing, mixing and dispensing food products, especially oil and water containing emulsions. Examples of such emulsions are dressings, mayonnaise, sauces, yoghurts, spreadable products such as margarine, and fresh
15 cheese type of products. The apparatus is particularly suitable for the preparation of mayonnaise or dressing type of products and for the preparation of products with limited stability such as vinaigrette, which easily separates into an aqueous phase and an oil phase on storage. An advantage of the apparatus
20 according to the invention is that it enables the preparation of a product on the spot. The freshness of such products is increased compared to products that are produced in a factory. Furthermore the products produced with this apparatus do not
25 need the inclusion of preservatives because they are readily made and consumed shortly after their preparation. This increases the taste and flavour quality of the products.

In the context of the invention the term "mixing" comprises blending and emulsification.

30

The apparatus is meant for use by consumers, as opposed to use in a factory. In the context of the invention the term consumer refers to an individual person who is either end consumer or

e.g. assistant in a shop or restaurant and who operates the apparatus. For some applications the apparatus may offer a relatively high throughput in the range of up to thousands of kilograms per hour.

5

Hereinafter the invention will be elucidated while referring to the drawings. In these drawings:

Figure 1, 2 and 3 show schematic embodiments of the apparatus according to the invention.

10

Before giving a detailed description of the figures, the following is noted. In figure 1,2 and 3 a preferred embodiment of the apparatus according to the invention is shown. Only parts of the apparatus essential for understanding the

15 invention have been illustrated. It will be appreciated that the apparatus will further comprise the general means for making it function such as pumps, lines, valves, control panels, electricity inlet and the like.

20 The apparatus comprises a source unit (a) comprising component reservoirs (1). According to one embodiment, the source unit comprises separate reservoirs for ingredients that are used to make a base product. Examples of these ingredients are an oil phase, aqueous phase and optionally emulsifier. These

25 components are the basic ingredients for providing an oil and water type of emulsion. It will be appreciated that from these basic ingredients any type of final product with a variety of texture, viscosity, appearance and taste may be prepared.

30 Optionally the source unit (a) comprises more than 1 reservoir for the same ingredient, e.g. two oil reservoirs. This set up may be used when the level of one ingredient in the product is very high, e.g. a level of 80% oil in a mayonnaise.

Alternatively or in addition to the above ingredients, the apparatus comprises reservoirs comprising a base product which is a mixture of ingredients such as e.g. a sauce base, a
5 mayonnaise base, a dressing base, a margarine base or a concentrated tomato base. In a preferred embodiment, the base is a product that does not have a dominant taste or flavour. In an alternative embodiment, the base is a concentrate:

10 Optionally an aqueous phase reservoir is in the form of a connection to tap water.

The source unit (a) may be physically recognisable as one separate unit in the apparatus. Alternatively certain
15 reservoirs that belong to the source unit (a) are placed at a different location in the apparatus as that may lead to more efficient use of space.

The apparatus is provided with selection means to enable the
20 selection of a particular ingredient, base product or combination thereof from the reservoirs in source unit (a). In addition thereto the selection means may be such that it enables the selection of a ratio of volumes of the particular ingredient or base product. Alternatively the volumes are set
25 volumes which can not be individually adapted.
Preferably the apparatus comprises an interface which enables a consumer to select one or more end products for production.

The reservoirs are connected to a processing means (2). The
30 processing means comprises an inlet for components originating from the reservoirs (1) and for post-added ingredients. The processing means should be suitable for mixing the ingredients originating from the reservoirs in source unit (a) and the

post-added ingredients. It is therefore preferred that the processing means is a mixer such as a static mixer or a dynamic mixer. Although the use of a mixer is preferred to obtain homogeneous end products, optionally they are eliminated. The
5 elimination of the mixer may be used to provide special effects e.g. red tomato striping on mayonnaise.

Optionally the processing means is provided with a heating or cooling element, a shear device such as a homogeniser, or an
10 ultrasound generator. Examples of a suitable heating element are a microwave generating unit, inductive heating element and an ohmic heating element. The ultrasound generator may e.g. be used for emulsification or solubilisation.

15 According to a preferred embodiment, the processing means comprises a pre-mixer for mixing the ingredients from the component reservoirs in source unit (a) before adding any post-added ingredients from source unit (b). The inclusion of a pre-mixer is highly preferred for the preparation of emulsions
20 such mayonnaise when starting from the raw ingredients in stead of a base product. For further details on the apparatus suitable for preparing emulsions such as mayonnaise, reference is made to figure 1 and the description thereof.

25 Post-added ingredients are defined as ingredients that can be added to a base product to differentiate it and which preferably require little or no shear to be included in the products.

30 The apparatus comprises at least one source unit (b) wherein the post-added ingredients are grouped in at least two families. Each family of ingredients is composed of at least 1 ingredient, preferably at least 2 ingredients, more preferred

from 3 to 10 ingredients. Although it is possible to mix all post-added ingredients with the components from the reservoirs of source unit (a) in one mixer, it is highly preferred that the processing means comprises dedicated mixing units for each family of ingredients. Each family of post-added ingredients is composed such that each member thereof is highly similar in colour, taste and consistency such that little residue that may remain in the mixer will not have an adverse effect on the perception of the product by the end-user. Most preferred a consumer would not notice cross contamination with previously made product. Therefore e.g. strong flavours will require a separate post-mixer.

Examples of preferred families are: herbs, colorants, flavourings, thickeners such as starch; pastes such as tomato, avocado pastes; fresh dairy ingredients such as fresh cheese, yoghurt; benefit agents such as vitamins, fortifiers; ingredients for preparing a cocktail sauce e.g. brandy, tomato concentrate; ingredients for preparing white dressings e.g. starch in water, cheese, yoghurt, cream, quark.

The composition of the families may be such that there is overlap between the ingredients. For example one family may be the family of structuring agents which includes as ingredients a starch containing composition, a yoghurt and a fresh cheese base. Another family may be the family of flavouring agents which may include yoghurt or it's concentrate as well.

The apparatus further comprises means (5) for feeding the post-added ingredients. Examples of such means are pipes, ducts or tubes that form a connection between the source unit (b) for post-added ingredients and the processing means. Furthermore feeding means may comprise a pump to cause a portion of the

post-added ingredients to flow into the processing means. Alternatively feeding means comprise dosing means for dosing a liquid or a powder in the processing means. These dosing means are preferably suitable for in line feeding.

5

The apparatus comprises means for selecting the desired type and amount of post-added ingredients. This enables an individual user of the apparatus to select his own desired composition in terms of type of base product on the one hand
10 and type and amount of post-added ingredients on the other hand.

The apparatus further comprises a dispensing unit (7). To minimise the volume of the previous product in a new dose the
15 volume of the lines or tubes between processing means and dispenser is preferably as small as possible.

The apparatus according to the invention may be operated manually but it is preferred to have it controlled
20 automatically e.g. via a computer with touch screen or a PLC or other alternative electronic devices. Preferably the pumps are electrically driven and controlled.

In a preferred embodiment, the apparatus comprises a pump regulator module connected to each reservoir. A programmable
25 control module may be connected to the pump regulator module for controlling and dispensing a predetermined amount of product.

The apparatus may be placed at any spot in a restaurant, store
30 or other retail outlet. It is preferred that the size is such that it fits on a regular counter, or could be stand-alone. The preferred size of the reservoirs in the apparatus depends on the product formulation and the allowed interval in between re-

filling (e.g. 0.5 litre for flavours, 10 litres for oils). On locations with high throughput some or all the reservoirs may be remote from the processing part and much larger in size (e.g. 100 litres of oil).

5

The preferred dispensing volume is from 1 to 200 ml prepared within 1 to 60 seconds.

Optionally the apparatus comprises a storage unit for bottles
10 or other packaging material in which the product may be dispensed. Such storage unit may be positioned such that a consumer manually takes a bottle and places it under the dispensing unit. Alternatively the apparatus is constructed such that the selection of a metered amount of product triggers
15 the automatic placement of a bottle or other packaging material to receive the dispensed product.

Optionally the apparatus is provided with a cleaning unit that may be used to regularly clean the apparatus
20 (semi)automatically.

The apparatus according to the invention may be provided with means for cooling and/or heating the reservoirs for example a chilled reservoir to keep the egg-yolk or another phase stable
25 for a longer period. Optionally the apparatus comprises an electrically heated reservoir to give fats/oils a lower viscosity.

Thus, the circumstances for preparing the product may be controlled temperature-wise.

30

Optionally the product is directly dispensed on a plate to be combined with other food or directly on a final food preparation.

- 5 It is preferred that the main components of the apparatus are made of a suitable, easy to clean material. Examples of suitable material are stainless steel, plastics. The tubes are preferably made of material compatible with the ingredients, e.g. neoprene, silicone, viton etc.

10

For the preparation of dressings it is most preferred that the reservoirs comprise at least an oil phase, vinegar and egg yolk. Optional post-added ingredients are herbs, starch, garlic, and tomato concentrate such as ketchup.

15

For the preparation of sauces the reservoirs preferably comprise an oil phase and an aqueous phase. Optional post-added ingredients are starch, thickener, herbs, spices, vegetable (pieces), colorant, preservatives.

- 20 Optionally the oil phase is replaced by another structuring phase such as a tomato or avocado base which derive their structuring capability from the presence of plant fibres.

- For the preparation of spreadable products the reservoir
25 preferably comprises an oil phase, an aqueous phase and emulsifier. Optional post-added ingredients are benefit agents such as vitamins, thickeners such as starch, gums, preservatives, vitamins; colorants and salt.

- 30 Figure 1 shows an embodiment of an apparatus for mixing components for the preparation of emulsion type products. The apparatus comprises a source unit (a) comprising component reservoirs (1). The component reservoirs are connected to

a pre-mixer unit (3) suitable for creating an oil and water emulsion. In one embodiment, the source unit comprises separate reservoirs for oil phase, aqueous phase and emulsifier. These components are the basic ingredients for providing an oil and water type of emulsion.

The pre-mixer unit (3) should be selected such that the product resulting from the pre-mixing operation is an emulsion.

Generally this is obtained by using a pre-mixer which imparts sufficient shear to create an oil and water emulsion. Suitable characteristics of the pre-mixer are that it comprises a part wherein a coarse emulsion is prepared, preferably having an average droplet diameter ($D_{3,2}$) of less than 20 micrometer, such as by using a pin stirrer unit, and a high shear part wherein the emulsion is made fine, preferably to an average droplet diameter ($D_{3,2}$) of less than 10 micrometer, more preferred less than 5 micrometer.

Generally for example a static mixer could be suitable but in cases where a fine emulsion is required it is preferred to use a dynamic mixer consisting of a rotating shaft with impeller and a housing. It is appreciated that there are alternative means to make an emulsion e.g. by electric fields, ultra-sound etc.

The reservoirs are connected to the pre-mixer via tubes (4).

In a preferred embodiment the reservoirs are connected to the pre-mixer unit via positive displacement pumps. These pumps enable accurate dosing of ingredients into the pre-mixer unit.

30

The post-added ingredients are stored in reservoirs (b1) in source unit (b). They are preferably mixed into the emulsion created in the pre-mixer via a mixing unit (6). Although the

use of post mixers is preferred to obtain homogeneous end products, optionally they are eliminated. The elimination of the post-mixers may be used to provide special effects e.g. red striped products.

- 5 According to another embodiment, part of the post-added ingredients are added by in-line addition which eliminates the need for dedicated mixers. This in-line addition may for examples be used for the addition of certain flavour concentrates.

10

To avoid cross-contamination of the different variants that may be dispensed, the processing means comprises a dedicated mixer (6) for each family of post-added ingredients.

- 15 In all embodiments of the invention, the volume of the mixing means is preferably small in comparison to the volume of the product to be dosed. E.g. a ratio of from 1 volume unit for the mixer to at least 5 volume units for the dosed product, preferably 5-100 volume units, more preferred 10 to 40 volume
20 units for the dosed product was found suitable. The small volume of the post-mixer in comparison to the next product dose is believed to have the following benefit.

When the customer changes the recipe, only a small part of the next dose will contain the previous product. This allows to
25 feed more post mix ingredients through the same post-mixer.

In use a consumer will obtain a container which is placed beneath the dispensing unit (7). The consumer chooses the type of product, amount and variety by pressing buttons on a control
30 panel.

In an even more preferred embodiment the apparatus according to figure 1 is used for the preparation of a dressing.

In this embodiment, the source unit (a) comprises three reservoirs; one for an oil phase, one for an aqueous phase and
5 optionally one for emulsifier, preferably egg yolk. The preferred aqueous phase is vinegar for these products. In operation, from 30 to 80 wt% oil phase, from 20 to 70 wt% aqueous phase preferably including emulsifier preparation are dosed into the pre-mixer unit (3) by the operation of selection
10 means. In the pre-mixer unit an oil in water emulsion is prepared to result in a dressing-base. The dressing base is subsequently dosed into a mixing unit (6). To this mixing unit, post-added ingredients are added. The preferred post-added ingredients that are selected via the selection means are one
15 or more from the family of herbs, one or more from the family of sweet flavouring agents, one or more from the family of salty flavours, one or more from the family of structuring agents and one or more of the family of structuring agents such as starch and other thickeners or gelling agents.

20 If herbs are added they are preferably pre-dispersed in an aqueous composition to facilitate their dosing.

For the preparation of a reduced fat dressing, base product created in mixer (3) is mixed with an aqueous phase containing starch in mixer (6a). The resulting product is dispensed via a
25 dispensing tube that is connected to the mixer (6a).

For the preparation of a herb variant, herbs, starch phase and garlic are mixed with the base product in mixer (6b). The resulting product is dispensed via a dispensing tube that is connected to the mixer (6b).

30 For the preparation of a cocktail sauce variant tomato concentrate and brandy are mixed with the base product in mixer (6c). The resulting product is dispensed via a dispensing tube that is connected to the mixer (6c).

Hence the apparatus according to figure 1 is suitable for dispensing a variety of products that can be selected by a consumer without the need for extensive cleaning operations 5 when there is a product switch.

In figure 2 an apparatus according to the invention is shown for preparing vinaigrette.

10 In this embodiment, the source unit (a) comprises two reservoirs; one for an oil phase, one for an aqueous phase. The preferred aqueous phase is vinegar for these products. In operation, from 30 to 80 wt% oil phase and from 20 to 70 wt% aqueous phase are pumped to mixing unit (6). To this mixing 15 unit, post-added ingredients are added. The preferred post-added ingredients that are selected via the selection means are one or more from the family of herbs, one or more from the family of herbs, one or more of the family of oils and one or more from honey and mustard and one or more from a flavour 20 concentrate such as raspberry concentrate. In mixer (6) all ingredients are blended and subsequently the resulting vinaigrette is dispensed via dispensing unit (7). By selecting only olive oils for addition to the blend of oil and vinegar, a classical vinaigrette may be prepared. The selection of a 25 combination of herbs and garlic concentrate enables the formation of herb and garlic vinaigrette. The selection of addition of honey/mustard to the blend of oil and vinegar, a honey/mustard vinaigrette is prepared. The mere addition of raspberry flavour to the blend of oil and vinegar in mixer (6) 30 leads to formation of a raspberry vinegraitte.

Figure 3 shows an apparatus that is suitable for preparing a dressing and a vinaigrette. In this apparatus the source unit (a) is shared between the two different product streams. Selection means enable the preparation of one product which is
5 a dressing or a vinaigrette. For the preparation of the vinaigrette the pre-mixer (3) need not be included in the process. For the preparation of dressings the process includes treatment with the pre-mixer (3) and further in (preferably dedicated) post-mixers (6a, 6b, 6c).

10

In a further aspect the invention relates to a method for mixing components for the preparation of emulsion type products, using an apparatus according to the invention wherein post-added ingredients arranged in families and are added to a
15 base product by addition of the post-added ingredients via dedicated mixers for each individual family.

In case of the preparation of a dressing type of product, it is preferred that the reservoirs are provided with an oil phase,
20 an aqueous phase below pH 3.8 and an emulsifier, said oil phase, aqueous-phase and emulsifier are pumped to a pre-mixer creating an emulsion, followed by adding ingredients from the group comprising herbs, fruit or vegetable concentrates, colorants, flavourings, vitamins, starches solutions, pastes
25 fresh cheese, yoghurt, via dedicated post-mixers and dispensing the dressing. The oil phase may comprise ingredients such as beta-carotene before the emulsion is prepared.

The invention is not limited to the embodiments described
30 before, which may be varied widely within the scope of the invention as defined by the appending claims.

Claims



1. Apparatus for preparing and dispensing a food product, preferably oil and water containing emulsions, the apparatus comprising a frame comprising

- a source unit (a) comprising component reservoirs;
- selection means for selecting the desired components and/or their ratio
- a source unit (b) for post added ingredients wherein the post added ingredients are arranged in at least two families;
- selection means for selecting the desired post-added ingredients;
- processing means suitable for mixing the components from the component reservoirs and the post-added ingredients;
- a dispensing unit.

2. Apparatus according to claim 1, wherein the processing means comprises a pre-mixer unit suitable for creating an oil and water emulsion.

3. Apparatus according to claim 1 or 2, wherein the source unit (a) comprises separate reservoirs for a composition selected from the group comprising oil phase, an aqueous phase, emulsifier, tomato base, mustard, mayonnaise base, dressing base and sauce base.

4. Apparatus according to any of claims 1-3, which comprises a dedicated mixer for each family of post-added ingredients.

5. Apparatus according to any of claims 1-4 wherein the families of ingredients are selected from the group comprising flavouring agents, structuring agent, herbs, colourants.
6. Method for mixing components for the preparation of emulsion type food products, using an apparatus according to any of claims 1-5 wherein the components of an oil phase reservoir, aqueous phase reservoir and emulsifier reservoir are mixed in a pre-mixer to obtain an emulsion, followed by addition of post-added ingredients via dedicated mixers for each family of post-added ingredients.
7. Method for the preparation of a dressing using an apparatus according to any of claims 1-5 wherein the source unit (a) comprises separate reservoirs that are provided with an oil phase, an aqueous phase preferably below pH 3.8 and an emulsifier, said oil phase, aqueous phase and emulsifier are pumped to a pre-mixer creating an emulsion, followed by addition of post-added ingredients from the family of herbs, the family of colorants and the family of flavourings via dedicated post-mixers, and dispensing the dressing.

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**ABSTRACT**

The invention relates to an apparatus suitable for preparing a variety of emulsion type of food products. The apparatus comprises a source unit (a) for components that are used to make a base product and a source unit (b) for post-added ingredients. It is preferred that the apparatus comprises separate mixers for each family of post-added ingredients.

Figure 1

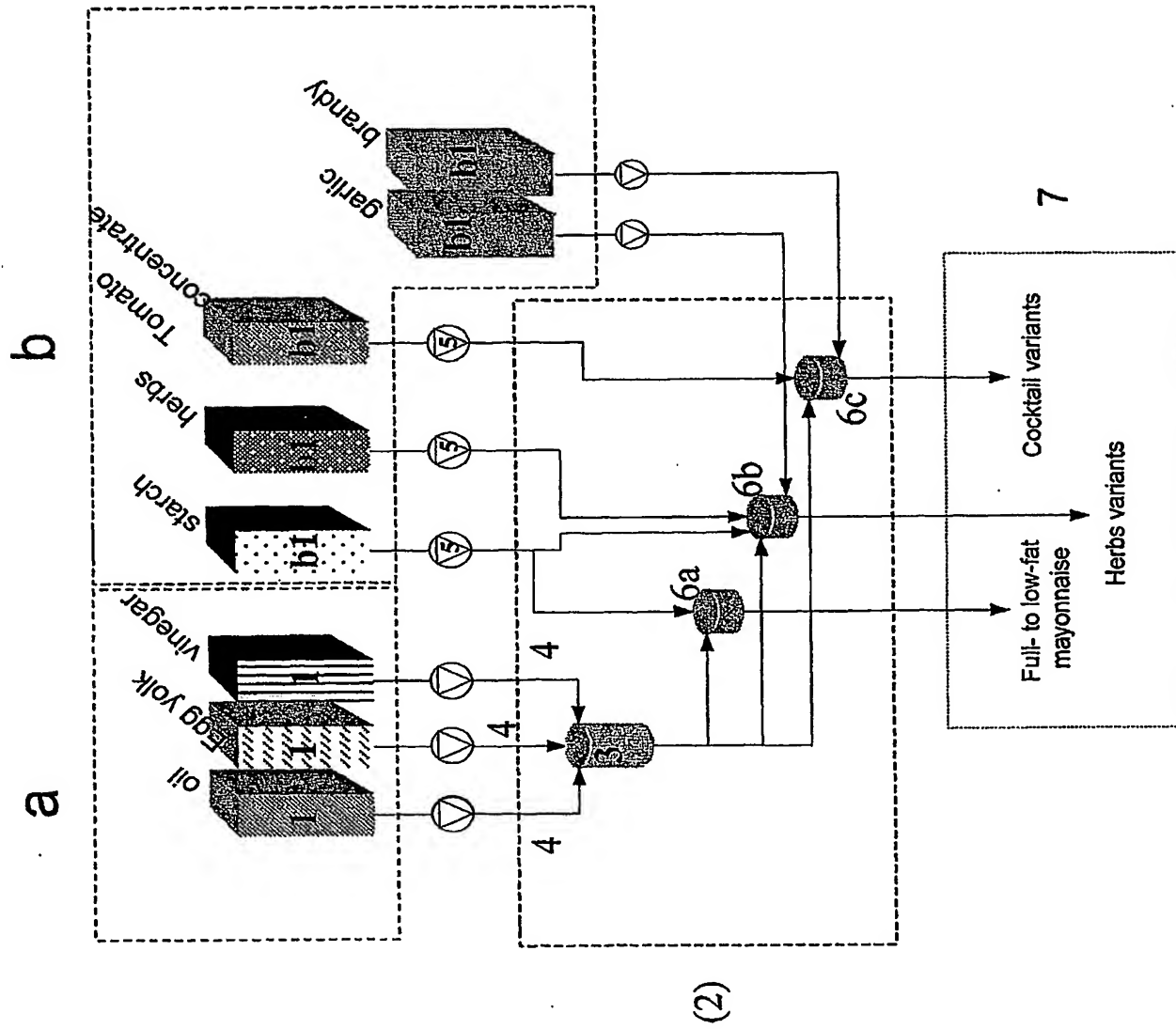


Figure 1

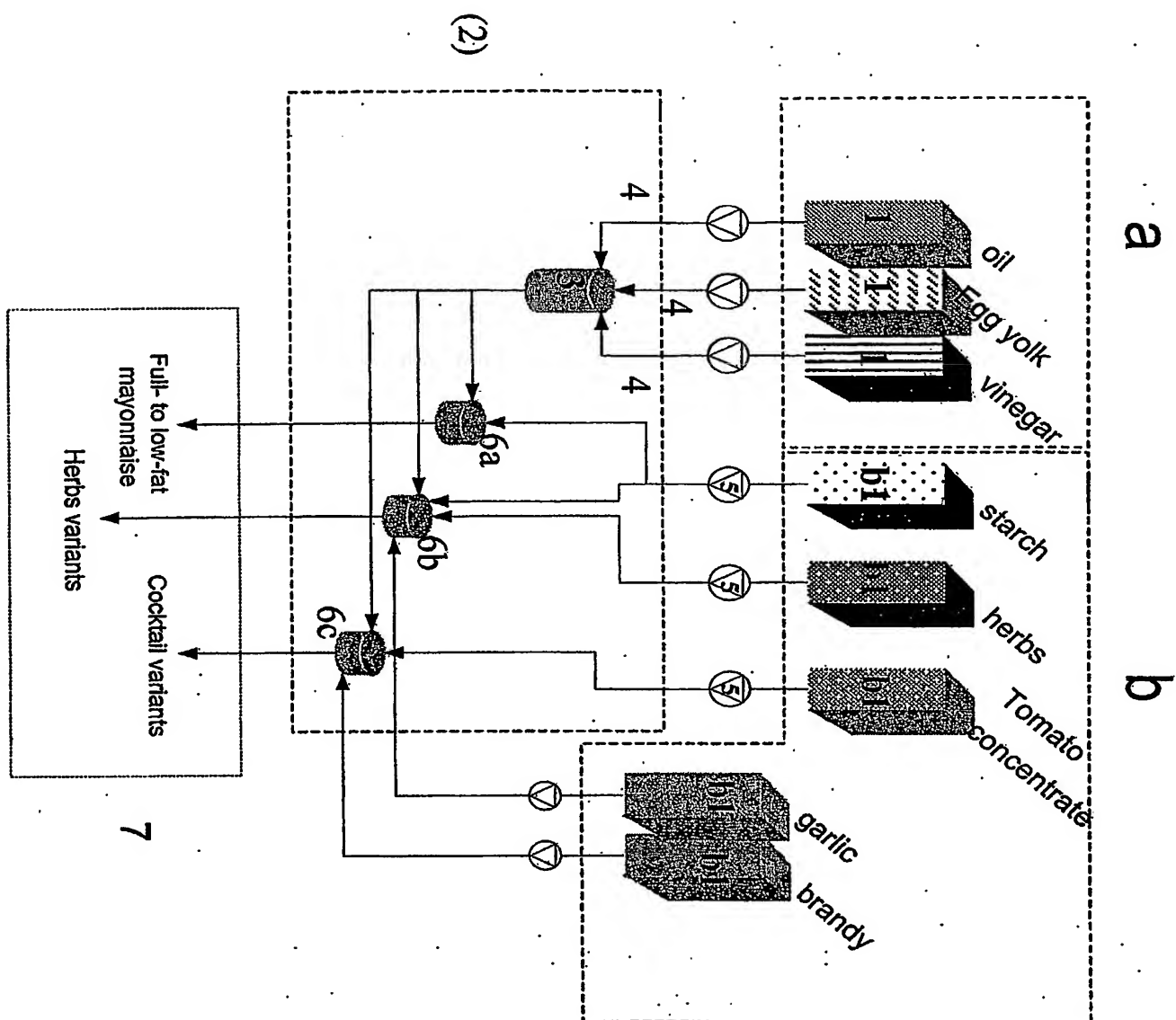


Figure 2

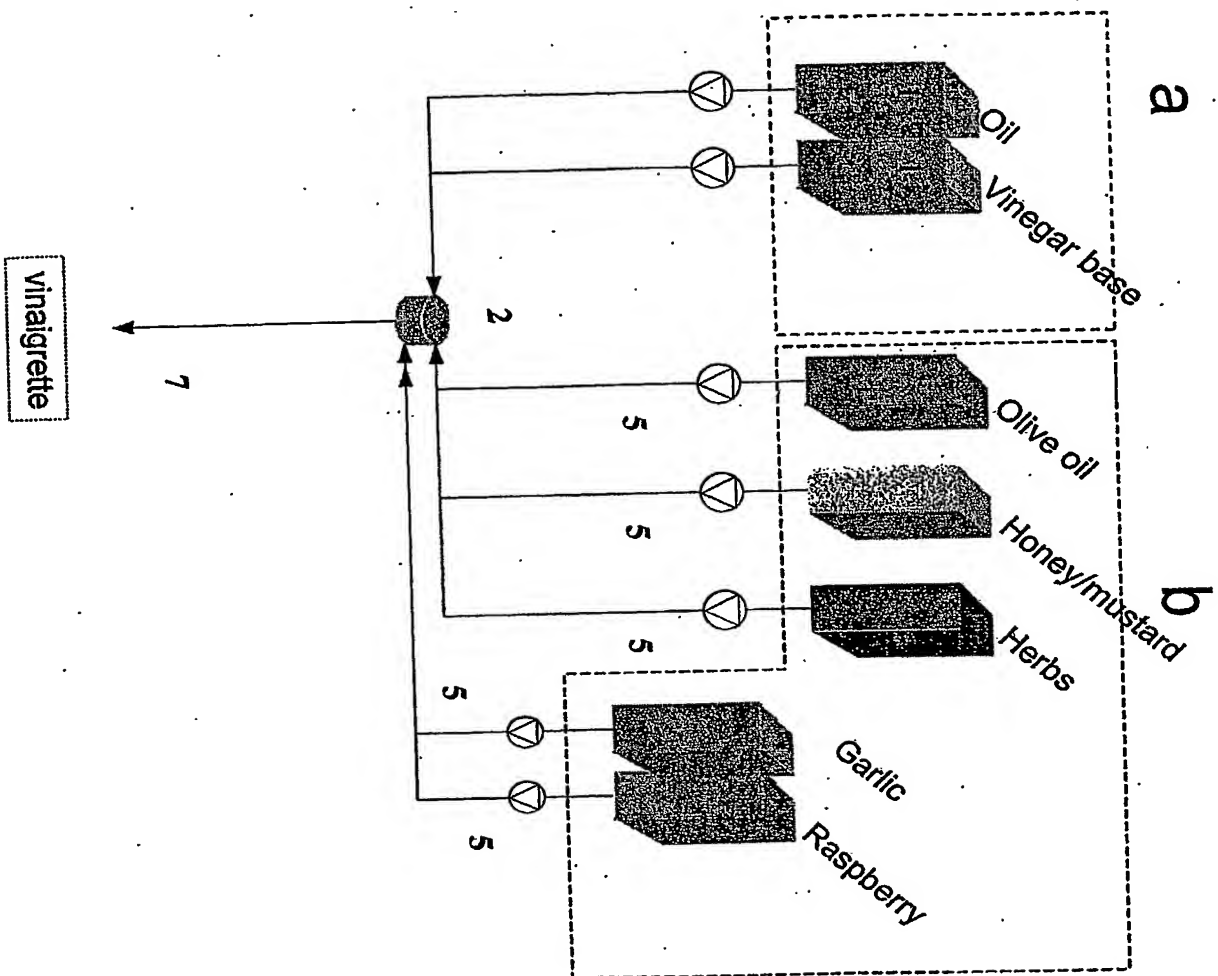
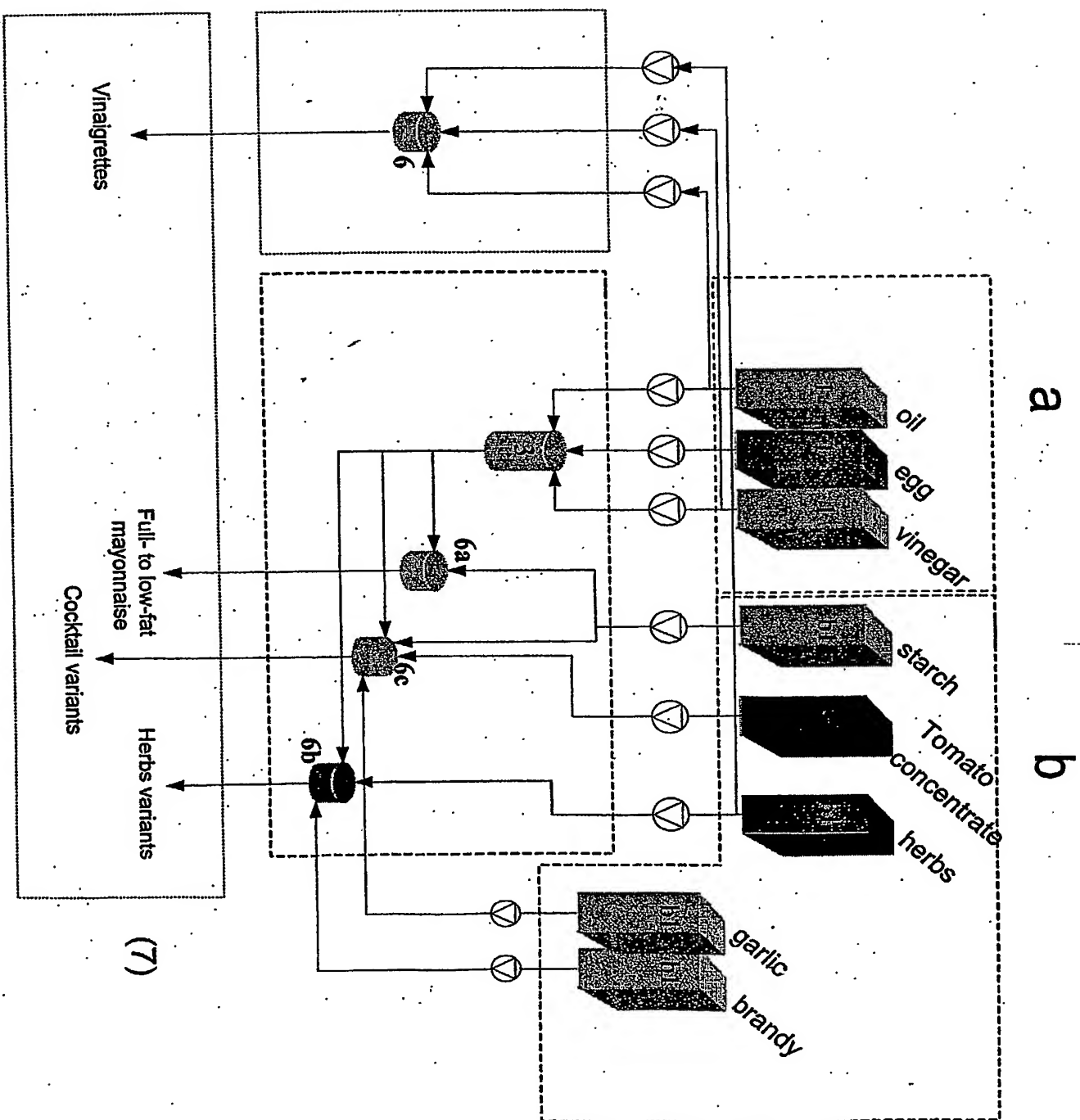


Figure 3



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